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Attorney Docket No.: 12758-028001
Client's Ref. No.: 1998P02873WOUS

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09/806,052

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JC07 Rec'd PCT/PTO 26 MAR 2001

SUBSTITUTE FORM PTO-1390 U.S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER
12758-028001

U.S. APPLICATION NO. (If Known, see 37 CFR 1.5)
09/806052

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE99/03171	1 October 1999	5 October 1998

TITLE OF INVENTION
METHODS FOR TRANSMITTING DIGITAL INFORMATION STRUCTURED IN BIT GROUPS ACCORDING TO A PROTOCOL DESIGNED FOR ANOTHER BIT GROUP STRUCTURE

APPLICANT(S) FOR DO/EO/US
Michael Paar, Jürgen Wienböker and Gerhard Vogt

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)).
4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☐ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 16 below concern other documents or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:
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U.S. APPLICATION NO. (IF KNOWN) 09/806052	INTERNATIONAL APPLICATION NO. PCT/DE99/03171	ATTORNEY'S DOCKET NUMBER 12758-028001

17. ☒ The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)- (5)):

	CALCULATIONS PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1000**	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$860**	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$710**	
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$690**	
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) **$100**	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$860.00
Surcharge of **$130** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$0.00

Claims	Number Filed	Number Extra	Rate		
Total Claims	10 - 20 =	0	x **$18**	$0.00	
Independent Claims	1 - 3 =	0	x **$80**	$0.00	
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ **$270**	$0.00	
TOTAL OF ABOVE CALCULATIONS =				$860.00	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				$0.00	
SUBTOTAL =				$860.00	
Processing fee of **$130** for furnishing the English Translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f))				$0.00	
TOTAL NATIONAL FEE =				$860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$0.00	
TOTAL FEES ENCLOSED =				$860.00	
				Amount to be refunded:	$
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a. ☒ A check in the amount of $860.00 to cover the above fees is enclosed.
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NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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NAME: P.A. Lichanco Paul A. Pysher

REGISTRATION NUMBER: 41,942 ~~40,780~~

Attorney's Docket No.: 12758-028001 / 1998P02873WOUS

JC08 Rec'd PCT/PTO 26 MAR 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Jürgen Wienböker et al.	Art Unit	: Unknown
Serial No.	: Unassigned	Examiner	: Unknown
Filed	: Herewith		
Title	: METHODS FOR TRANSMITTING DIGITAL INFORMATION STRUCTURED IN BIT GROUPS ACCORDING TO A PROTOCOL DESIGNED FOR ANOTHER BIT GROUP STRUCTURE		

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Washington, D.C. 20231

PRELIMINARY AMENDMENT

Prior to examination, please amend the application as follows:

In the claims:

Amend claims 5, 6, 8, and 9 as follows:

--5. The method as claimed in claim 1, characterized in that the first bit groups (QRT1-QRT94), before being combined into the second bit groups (OCT7-OCT53), are transmitted in accordance with a further protocol (PROT2).

6. The method as claimed in claim 1, characterized in that a second bit group (OCT7-OCT53) transmitted in accordance with the protocol (AAL) is divided into the original, up to 2^{M-N}, successive first bit groups (QRT1-QRT94).

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Samantha Bell
Signature

Samantha Bell
Typed or Printed Name of Person Signing Certificate

8. The method as claimed in claim 1, characterized in that the second bit groups (OCT7-OT53) transmitted in accordance with the protocol (AAL) are transmitted in accordance with the additional protocol (PROT3).

9. The method as claimed in claim 1, characterized in that the user information (NI) represents digitized voice information (SP).--

REMARKS

All amendments are to remove multiple dependencies. No new matter has been added. Attached is a marked-up version of the changes being made by the current amendment.

Applicant submits that all of the claims are now in condition for examination, which action is requested. Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 3/26/01

P.A. Pysher

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Version with markings to show changes made

In the claims:

Claims 5, 6, 8, and 9 have been amended as follows:

5. The method as claimed in [one of the preceding claims] claim 1, characterized in that the first bit groups (QRT1-QRT94), before being combined into the second bit groups (OCT7-OCT53), are transmitted in accordance with a further protocol (PROT2).

6. The method as claimed in [one of the preceding claims] claim 1, characterized in that a second bit group (OCT7-OCT53) transmitted in accordance with the protocol (AAL) is divided into the original, up to 2^{M-N}, successive first bit groups (QRT1-QRT94).

8. The method as claimed in [one of claims 1 to 5] claim 1, characterized in that the second bit groups (OCT7-OT53) transmitted in accordance with the protocol (AAL) are transmitted in accordance with the additional protocol (PROT3).

9. The method as claimed in [one of the preceding claims] claim 1, characterized in that the user information (NI) represents digitized voice information (SP).

Description

Method for transmitting digital information structured in bit groups according to a protocol designed for another bit group structure

In current communication networks, digital or digitized information is frequently exchanged with the aid of a number of different transmission methods, the information representing, for example, voice, text, data, characters, graphics, still or moving pictures which are also designated as user information in the technical world.

The different transmission methods are required, in particular, for communication networks which exhibit a hybrid mixture of different transmission technologies. Thus, more modern, faster transmission technologies - e.g. the STH or ATM technology - are more likely to be used in the core area of communication networks whilst in the periphery, also called the "last mile", proven transmission technologies are frequently used - e.g. the PCM 30 or GSM technology. Because of the enormous investment costs of a general exchange of the existing proven transmission technologies, this hybrid mixture of transmission technologies still persists. Information is transmitted for example in the case of a telephone call from a telephone set to a mobile, first via a circuit-oriented first access network, then via a packet-oriented core network and finally via radio-oriented second access network. In the technical world, such a transfer is also called transfer over a number of "subnetworks", the above two access networks and the core network being three examples of subnetworks.

To control the information transfer, protocols are used, subnetwork-specific protocols

being provided for the subnetworks. They are adapted to the transmission technology used in the subnetworks and usually have significant differences if the technology used is based on different transmission concepts and their technical peculiarities must be correspondingly taken into consideration in the protocols when controlling the information transfer. Examples of protocols for transmitting voice information digitized in accordance with pulse code modulation - also called PCM - are the ITU-T Standard G.704 for circuit-oriented transmission technology and the ITU-T Standard I.363.1 1996 for packet-oriented transmission technology. In radio-oriented transmission technology, voice information is usually transmitted not in accordance with a PCM method but as compressed digitized voice information, which is why for each connection a transmission capacity of only 32 kbit/s is required for DECT systems and only 13 kbit/s is required for GSM systems instead of the 64kbit/s transmission capacity required for digitized PCM voice information. For the radio-oriented systems, a multiplicity of transmission protocols are also provided which are in each case optimally designed for the structure of the compressed voice information - see, for example, J. Eberspächer, H-J. Vögel, "GSM - Global Systems for Mobile Communication", Verlag B.G. Teubner Stuttgart, 1997, pages 313-315 for GSM Systems and, for example, ETSI Standards ETS 300 175-1 - 300 175-9 for DECT systems. On transition between a radio-oriented system in which compressed digitized voice information is transmitted and a circuit-oriented system in which voice information digitized in accordance with a PCM method is transmitted, there is usually a conversion from one type of representation of the voice information into the other type, i.e. the digitized voice information is structured in each subnetwork into the bit groups for which the respective subnetwork-specific protocols are designed.

In the case of digital user information, the controlled transfer of user information according to a protocol, especially the insertion and removal of the user information in the and from the subnetwork-specific communication units used for the transfer, in most cases takes place in parallel bits i.e. in bit groups having a predetermined number of bits, the number of bits of a bit group frequently corresponding to a power to base two - that is to say the user information is transmitted in bit groups of in each case 2^N bits according to the protocol. Thus, for example, in the case of transmission according to the international ITU-T Standard I.363.1, the information section of an ATM cell is supplied with user information in bit groups of eight - that is to say 2^3 - bits, bit groups of eight bits also being called octets in the technical world.

If information is transmitted over a number of subnetworks serving different transmission protocols, a change of the protocol used for controlling the information transfer in the subnetworks is required at the transitions between the subnetworks. There is, for example, an internationally standardized method in which, in an ATM subnetwork, voice information digitized using pulse code modulation and therefore structured in bit groups of eight bits is transmitted in ATM cells. In the ATM subnetwork, the digitized voice information is transmitted in the information sections of ATM cells according to the ATM transmission protocol I.363.1 standardized by the ITU-T, the ATM adaptation layer type 1, also called AAL1, where, as already described, the information section of the ATM cells is also structured in bit groups of eight bits each. In accordance with the standard, bit groups of eight bits of the voice information digitized in accordance with the PCM method are inserted into the information section of ATM cells with bit groups of eight bits, which utilizes the

transmission capacity of the information section of the ATM cells to its full extent. The ATM communication protocol AAL1 is thus optimally adapted to the regular structure of eight bits each of the voice information digitized in accordance with the PCM method.

Furthermore, it is increasingly necessary to transmit user information which is structured in bit groups of fewer than eight bits, e.g. voice information which is digitized in bit groups for example of 4 bits, with the aid of a compression-type of adaptive differential pulse code modulation, also called ADPCM. Transmission using the known communication protocols designed for bit groups of, e.g., eight bits has not previously been provided.

The invention is thus based on the object of designing a method for transmitting digital user information structured in bit groups in accordance with a protocol which is designed for another bit group structure. The object is achieved by the features of patent claim 1.

The essential aspect of the invention can be seen in the fact that the user information is structured into first bit groups of in each case 2^N bits, that transmission according to the protocol takes place in two bit groups of in each case 2^M bits, M being greater than N, that in each case up to 2^{M-N} successive first bit groups are combined to form a second bit group, and that the first bit groups combined to form second bit groups are transmitted in accordance with the protocol. The essential advantage of the method according to the invention can be seen in that the first bit groups can be transmitted here by means of the protocol. A further advantage consists in that optimum utilization of the transmission capacity of a connection existing in accordance with the protocol can be achieved since 2^{M-N} combined first bit groups produce

exactly one second bit group of 2^M bits, that is to say each bit of the second bit group is used.

According to an embodiment of the method according to the invention, it is provided that the second bit groups are transmitted with the aid of ATM cells - claim 2. As a result, the method according to the invention can be advantageously used in a modern ATM subnetwork. A further advantage is that, in combination with the features of claim 1, a minimum number of ATM cells is required for transmitting the voice information and thus the transmission capacity for transmitting further information can be maximally utilized.

According to a further development of the method according to the invention, it is provided that the protocol is designed in accordance with International ITU-T Standard I.363.1 - claim 3. The user information inserted into the ATM cells in accordance with the method according to the invention can be advantageously supplied to the communication facilities of the most varied manufacturers which are already using the I.363.1 Standard. As a further advantage, the time requirements applicable to the transmission of voice information are also guaranteed by the control characteristics of the control information inserted into the information sections of the ATM cells in accordance with the AAL1 protocol.

According to an alternative embodiment of the method according to the invention, it is provided that the second bit groups are transmitted with the aid of Internet packets - claim 4. This is associated with the advantage that the method according to the invention can be used in a modern Internet subnetwork. By suitably designing the lengths of the Internet packets, an optimized time division between the processing time and the preparation time for processing Internet packets can also be found in the communication facilities.

According to a further development of the method according to the invention, it is provided that the first bit groups, before being combined into the second bit groups, are transmitted in accordance with a further protocol - claim 5. This is associated with the advantage that the user information can be supplied to a first subnetwork in which the protocol is used, via at least one second subnetwork, a proven transmission technology being used, for example, in the second subnetwork and a more modern transmission technology being used in the first subnetwork. Thus, hybrid subnetworks can be combined to form one communication network.

According to an embodiment of the method according to the invention, it is provided that a second bit group transmitted in accordance with the protocol is divided into the original, up to 2^{M-N} first bit groups, successive - claim 6. By this means, the original user information is advantageously recovered after a transmission in accordance with the protocol.

According to a further development of the method according to the invention, it is provided that the original first bit groups, after distribution from the second bit groups, are transmitted in accordance with an additional protocol - claim 7. As a result, the user information, after having been transmitted in the first subnetwork in which the protocol is used, can be advantageously transmitted further via at least one third subnetwork, where, for example, a radio-oriented transmission technology is used in the third subnetwork and a circuit-oriented transmission technology is used in the first subnetwork. Thus, hybrid communication networks can be set up, for example ATM systems can be combined with GSM systems.

According to a further development of the method according to the invention, it is provided that the second bit groups transmitted in accordance with the protocol are

transmitted in accordance with the additional protocol - claim 8. During this process, the user information inserted in the second bit groups is advantageously inserted directly, i.e. without removing the original user information from the second bit groups, into the third protocol;
this enables faster conversion to the third protocol.

According to a further advantageous embodiment of the method according to the invention, it is provided that the user information (NI) represents digitized voice information - claim 9. In this context, a maximum of voice information can be transmitted in subnetworks having a limited transmission capacity.

A further development of this embodiment of the method according to the invention provides that the voice information is digitized into first bit groups of four bits in accordance with an adaptive differential pulse code modulation method - claim 10. In this context, the number of subnetwork-specific transmission units, e.g. ATM cells or Internet packets, needed for transmitting the voice information, can be advantageously reduced by at least a factor of two.

In the text which follows, the method according to the invention is explained in greater detail with reference to two figures, in which:

- Figure 1 shows a sequence of subnetworks in which the user information is transmitted in accordance with different protocols, and
- Figure 2 shows an ATM cell in accordance with the AAL1 protocol which is supplied with user information according to the method according to the invention.

Figure 1 shows by way of example a communication network (KN) which consists of three subnetworks (TN1-TN3), the method according to the invention being provided for the first subnetwork (TN1) in accordance with a protocol (AAL) used there and designed for bit groups of

eight bits each (OCT7-OCT53), also called octets in the text below. In the first subnetwork (TN1), transmission is, for example, by means of ATM cells (AZ) or Internet packets (IP). The second subnetwork (TN2) is connected to the first subnetwork (TN1) by a first communication facility (KE1). In the second subnetwork (TN2) information is transmitted, for example, in accordance with a second protocol (PROT2) designed, for example, for bit groups of four bits each (QRT1 to QRT94), also called quartets in the text below. The third subnetwork (TN3) is connected to the first subnetwork (TN1) by a second communication facility (KE2). In the third subnetwork (TN3), the information is transmitted in accordance with a third protocol (PROT3), the third protocol (PROT3) being designed, for example, for quartets - indicated by a continuously drawn arrow inside the third subnetwork (TN3) in Figure 1 - or for octets - indicated by a dashed arrow inside the third subnetwork (TN3) in Figure 1.

Figure 2 shows by way of example an ATM cell (AZ) which is structured in octets (OCT7-OCT53). The ATM cell (AZ) consists of a header (KT) comprising five octets (OCT1-OCT5) and an information section (IT) comprising 48 octets (OCT6-OCT53). In the information section (IT), the first octet (OCT6) contains control information (AALH) for controlling the transmission of voice information (SP) according to the AAL1 protocol (AAL). The remaining 47 octets (OCT7-OCT53) of the information section (IT) of the ATM cell (AZ) are used for transmitting user information (NI). Furthermore, 94 quartets (QRT1-QRT94) are indicated which represent the original voice information (SP) digitized in accordance with a compression-type of adaptive differential pulse code modulation method ADPCM.

For the exemplary embodiment, it is assumed that the voice information (SP) to be transmitted in the first subnetwork (TN1) is digitized in accordance with a compression-type of adaptive differential pulse code

modulation method and structured into quartets. This voice information (SP) is supplied to the first subnetwork (TN1), in which the information transfer takes place in accordance with the AAL protocol (AAL), by the second subnetwork (TN2) in which the information transfer takes place in accordance with the second protocol (PROT2), conversion from the second protocol (PROT2) to the first protocol (AAL) taking place in a first communication facility (KE1).

According to the method according to the invention, two successive quartets (QRT1-QRT94) each of the compressed digital voice information (SP) are combined in the first communication facility (KE1) to form octets (OCT7-OCT53) and are inserted into the information section (IT) of an ATM cell (AZ) according to the AAL1 protocol (AAL), the octets (OCT7-OCT53) of the information section (IT) being occupied in ascending order. For example, the quartets ORT1 and QRT2 are combined to form an octet (OCT7) and inserted as seventh octet (OCT7) into the ATM cell (AZ) shown in Figure 2. When an ATM cell (AZ) designed according to the AAL1 protocol (AAL) is completely occupied, this ATM cell (AZ) is transmitted from the first communication facility (KE1) to the second communication facility (KE2) in the first subnetwork (TN1). The inserting of the quartets (QRT1-QRT94) transferred by the second subnetwork (TN2) is continued with a further ATM cell (AZ) having an information section (IT) which is still empty. The ATM cells (AZ) are transmitted in the first subnetwork (TN1) in accordance with the protocol I.363.1 standardized by the ITU-T, in which the special delay requirements existing in the transmission of voice information (SP) via a packet-oriented first subnetwork (TN1) are controlled with the aid of control information (AALH) inserted into the information section (IT) of the ATM cells (AZ).

If, for example, 8 000 quartets (QRT1-QRT94) are transmitted per second in the second subnetwork (TN2), 94 quartets (QRT1-QRT94) each can be transmitted with an ATM cell (AZ) in accordance with the method according to the invention, as a result of which 8 000/94, i.e. approximately 85 ATM cells (AZ), are required per second for transmitting the voice information (SP). If the quartets (QRT1-QRT94) were not combined and instead, for example, one quartet each with four binary "0s" were expanded to form one octet, then only 47 quartets (QRT1-QRT94) expanded to form octets (OCT7-OCT53) could be inserted into an ATM cell (AZ) designed in accordance with the AAL1 method (AAL), as a result of which 8 000/47, i.e. approximately 170, ATM cells would be needed for transmitting the compressed voice information (SP). The same number of cells is needed if the voice information (SP) were digitized into octets in accordance with the PCM method; this is assumed for the I.363.1 standard. When the method according to the invention is applied to the first subnetwork (TN1), this results in halving the ATM cells (AZ) needed for transmission according to the AAL1 protocol (AAL). An analogous calculation applies to Internet packets (IP).

As an alternative, voice information (SP) digitized in accordance with a pulse code modulation method and structured into octets - indicated by a dashed arrow designated by PCM30 in Figure 1 - can be transmitted in the second subnetwork (TN2), e.g. in a PCM30 subnetwork. The voice information (SP) is then compressed in accordance with the adaptive differential pulse code modulation method in the first communication facility (KE1). This has the advantage that the above-described reduction in ATM cells (AZ) needed for transmitting the voice information (SP) in the first subnetwork (TN1) is given even if no compressed voice information (SP) is transmitted in the second subnetwork.

After the ATM cells have been transmitted by the first subnetwork (TN1), up to 2^{M-N} first bit groups (QRT1-QRT94) are in each case taken from the transmitted octets (OCT7-OCT53) in the second communication facility (KE2) and combined to form the original sequence of first bit groups (QRT1-QRT94). This sequence of first bit groups (QRT1-QRT94) is optionally supplied to the third subnetwork (TN3) and transmitted in the latter in accordance with the third protocol (PROT3). In an alternative further development of the method according to the invention, the first bit groups (QRT1-QRT94) are not taken from the second bit groups (OCT7-OCT53) transmitted which are directly supplied to the third subnetwork (TN3) for further transfer in accordance with the third protocol (PROT3). The design of the third protocol in each case depends on the structure of the user information (NI) supplied in the two alternatives described.

In the case of transmission by means of Internet packets (IP) - indicated by a dashed arrow designated by IP in figure 1 - the insertion and removal of the quartets (QRT1-QRT94) representing the compressed voice information (SP) and combined to form octets (OCT7-OCT53) occurs analogously in the two communication facilities (KE1-KE2). Since Internet packets (IP) have a variable length in contrast to ATM cells (AZ), the capacity of the information section (IT) of an Internet packet (IP) provided for transmitting user information (NI) depends on the length of the Internet packet (IP). The length of the information section (IT) determines how many quartets (QRT1-QRT94) combined to form octets (OCT7-OCT53) can be transmitted with one Internet packet (IP), as a result of which possibly a different number of Internet packets (IP) per second is needed for transmitting compressed voice information (SP) than the approximately 85 ATM cells calculated in the above example. After an Internet packet (IP) has been completely occupied, this Internet packet

(IP) is transmitted from the first communication facility (KE1) to the second communication facility (KE2) in the first subnetwork (TN1) as in the method described above, and the method according to the invention is continued in the first communication facility (KE1) with a next Internet packet (IP) which is still unoccupied.

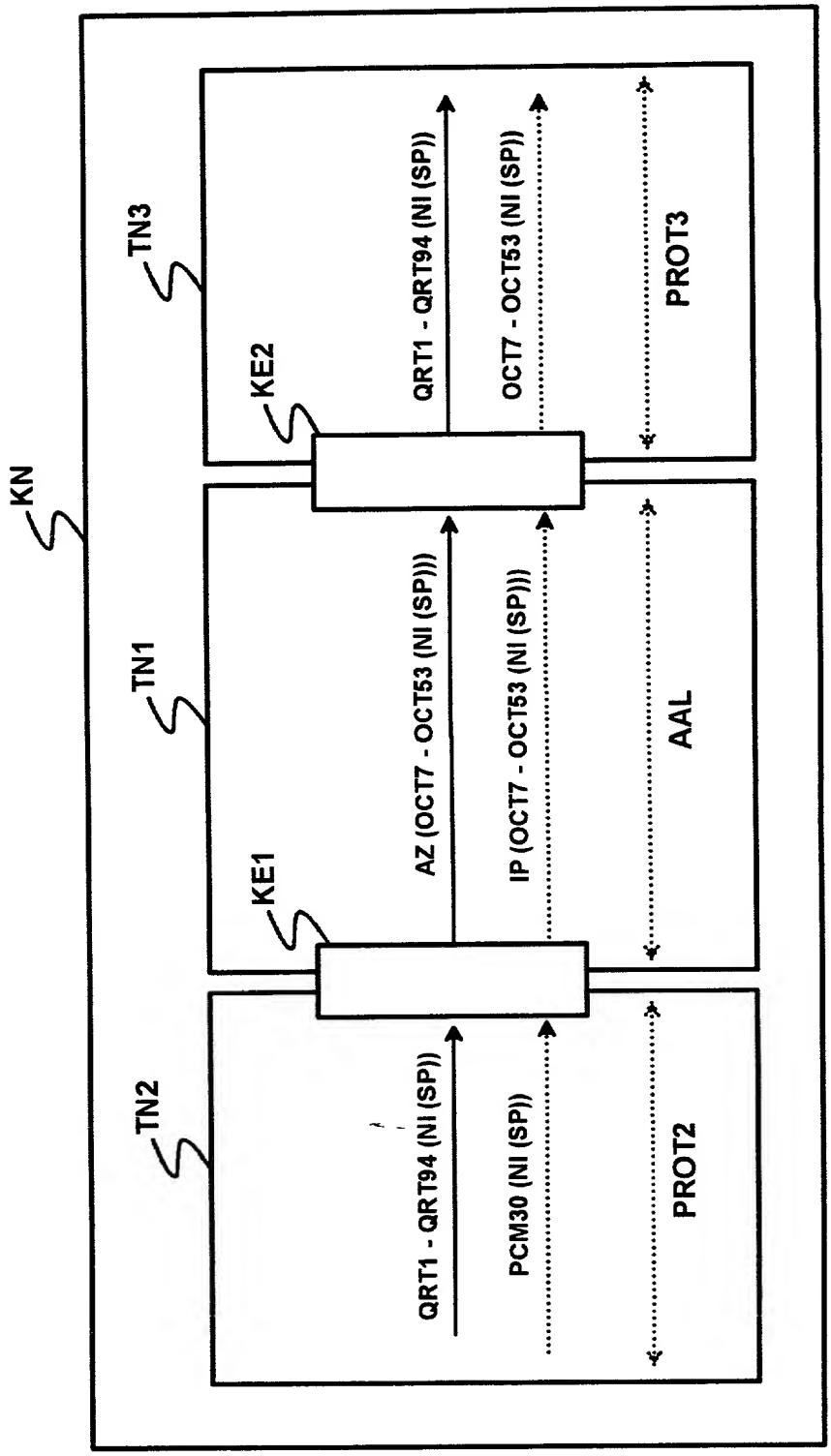
KN
TN3
KE2
QRT1 - QRT94 (NI (SP))
OCT7 - OCT53 (NI (SP))
PROT3
TN1
KE1
AZ (OCT7 - OCT53 (NI (SP)))
IP (OCT7 - OCT53 (NI (SP)))
AAL
TN2
QRT1 - QRT94 (NI (SP))
PCM30 (NI (SP))
PROT2

FIG 1

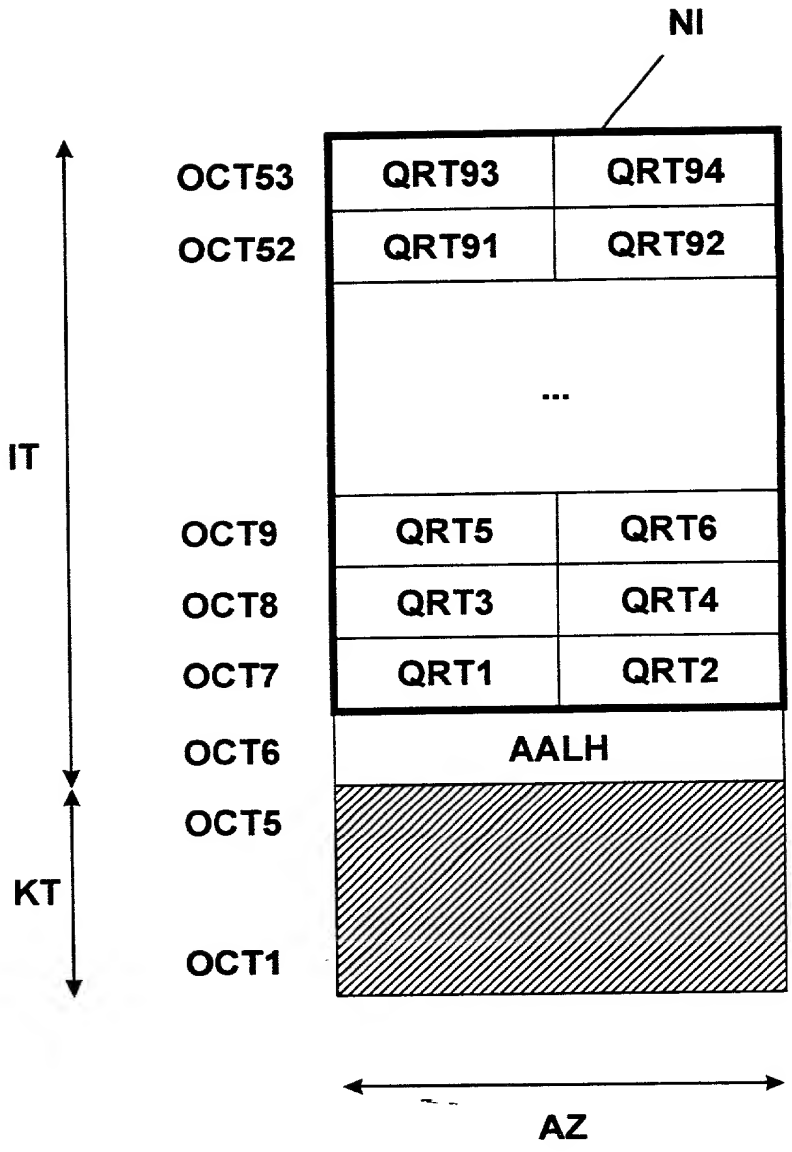

FIG 2

Patent Claims

1. A method for transmitting digital user information (NI),
- in which the user information (NI) is structured into first bit groups (QRT1-QRT94) of in each case 2^N bits,
- in which transmission according to the protocol (AAL) takes place in two bit groups (OCT7-OCT53) of in each case 2^M bits, M being greater than N,
- in which in each case up to 2^{M-N} successive first bit groups (QRT1-QRT94) are combined to form a second bit group (OCT7-OCT53), and
- in which the first bit groups (QRT1-QRT94) combined to form second bit groups (OCT7-OCT53) are transmitted in accordance with the protocol (AAL).

2. The method as claimed in claim 1, characterized in that the second bit groups (OCT7-OCT53) are transmitted with the aid of ATM cells (AZ).

3. The method as claimed in claim 2, characterized in that the protocol (AAL) is designed in accordance with International ITU-T Standard I.363.1.

4. The method as claimed in claim 1, characterized in that the second bit groups (OCT7-OCT53) are transmitted with the aid of Internet packets (IP).

5. The method as claimed in one of the preceding claims, characterized in that the first bit groups (QRT1-QRT94), before being combined into the second bit groups (OCT7-OCT53), are transmitted in accordance with a further protocol (PROT2).

6. The method as claimed in one of the preceding claims, characterized in that a second bit group (OCT7-

OCT53) transmitted in accordance with the protocol (AAL) is divided into the original, up to 2^{M-N}, successive first bit groups (QRT1-QRT94).

7. The method as claimed in claim 6, characterized in that the original first bit groups (QRT1-QRT94), after distribution from the second bit groups (OCT7-OCT53), are transmitted in accordance with an additional protocol (PROT3).

8. The method as claimed in one of claims 1 to 5, characterized in that the second bit groups (OCT7-OT53) transmitted in accordance with the protocol (AAL) are transmitted in accordance with the additional protocol (PROT3).

9. The method as claimed in one of the preceding claims, characterized in that the user information (NI) represents digitized voice information (SP).

10. The method as claimed in claim 9, characterized in that the voice information (SP) is digitized into first bit groups (QRT1-QRT94) of four bits in accordance with an adaptive differential pulse code modulation method.

Abstract

Method for transmitting digital information structured in bit groups according to a protocol designed for another bit group structure

According to the method according to the invention, digital voice information (SP) compressed into first bit groups (QRT1-QRT94) of 2^N bits is transmitted in ATM cells (AZ) or Internet packets (IP) by combining in each case up to 2^{M-N} first bit groups (QRT1-QRT94) to form a second bit group (OCT7-OCT53) of 2^M bits, M being greater than N, in accordance with a protocol (AAL) designed for the second bit groups (OCT7-OCT53). As a result, the compressed voice information (SP) is also transmitted efficiently in accordance with the protocol (AAL) designed for bit groups of 2^M bits.

Figure 1

Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

09/ 1052

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

Verfahren zum Übermitteln von digitalen, in Bitgruppen strukturierten Informationen nach Maßgabe eines auf eine andere Bitgruppenstruktur ausgelegten Protokolls

deren Beschreibung

(zutreffendes ankreuzen)

☒ hier beigefügt ist.

☐ am ______________ als
PCT internationale Anmeldung
PCT Anmeldungsnummer ______________
eingereicht wurde und am ______________
abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obige☐n Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

____
____
____
____
____

the specification of which

(check one)

☐ is attached hereto.

☐ was filed on ______________ as
PCT international application
PCT Application No. ______________
and was amended on ______________
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign appplications
Priorität beansprucht

			Priority Claimed	
198 45 754.5	Germany	05. Oktober 1998	☒	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhangig, aufgegeben)	(Status) (patented, pending, abandoned)
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhangig, aufgeben)	(Status) (patented, pending, abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

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ASSIGNMENT

For good and valuable consideration, I/we, the undersigned

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(Title:) **Verfahren zum Übermitteln von digitalen, in Bitgruppen strukturierten Informationen nach Maßgabe eines auf eine andere Bitgruppenstruktur ausgelegten Protokolls**

disclosed in the PCT international application for Letters Patent designating the United States, said application being identified in our records as

Applicants File No. **1998P02873WOUS**
and filed as PCT-application

and in and to said application and all divisional, continuing, substitute, renewal, reissue and all other applications for Letters Patent which have been or shall be filed in the United States on any of said improvements; and in and to all original and reissued patents which have been or shall be issued in the United States on said improvements;

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Date: 28-Feb-2001

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VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: *(Name und Registrationsnummer anführen)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

And I hereby appoint

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